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(54) **METHOD AND SYSTEM FOR VIDEO STREAM PERSONALIZATION**

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G06T 19/20 (2011.01)
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(52) **U.S. Cl.**
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See application file for complete search history.

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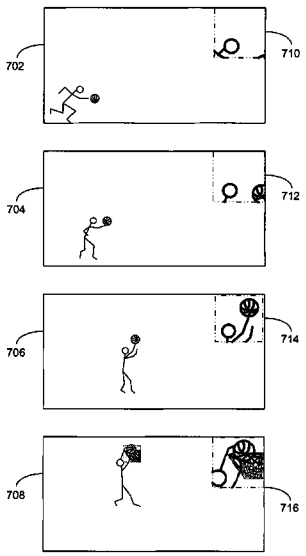
(57) **ABSTRACT**

A method and system for video stream personalization. A personalization policy may be accessed. The personalization policy may include an image identification and an image alteration to a video image identified by the image identification. At least one instance of the video image may be identified in a video stream. An output stream may be produced from the video stream in response to the personalization policy. The output stream may include the image alteration to the video image.

22 Claims, 11 Drawing Sheets



Related U.S. Application Data

continuation of application No. 11/786,663, filed on Apr. 11, 2007, now Pat. No. 9,137,497.

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G06F 16/74	(2019.01)
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H04N 21/44	(2011.01)
H04N 21/472	(2011.01)
H04N 21/482	(2011.01)
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H04N 21/235	(2011.01)
H04N 21/2668	(2011.01)
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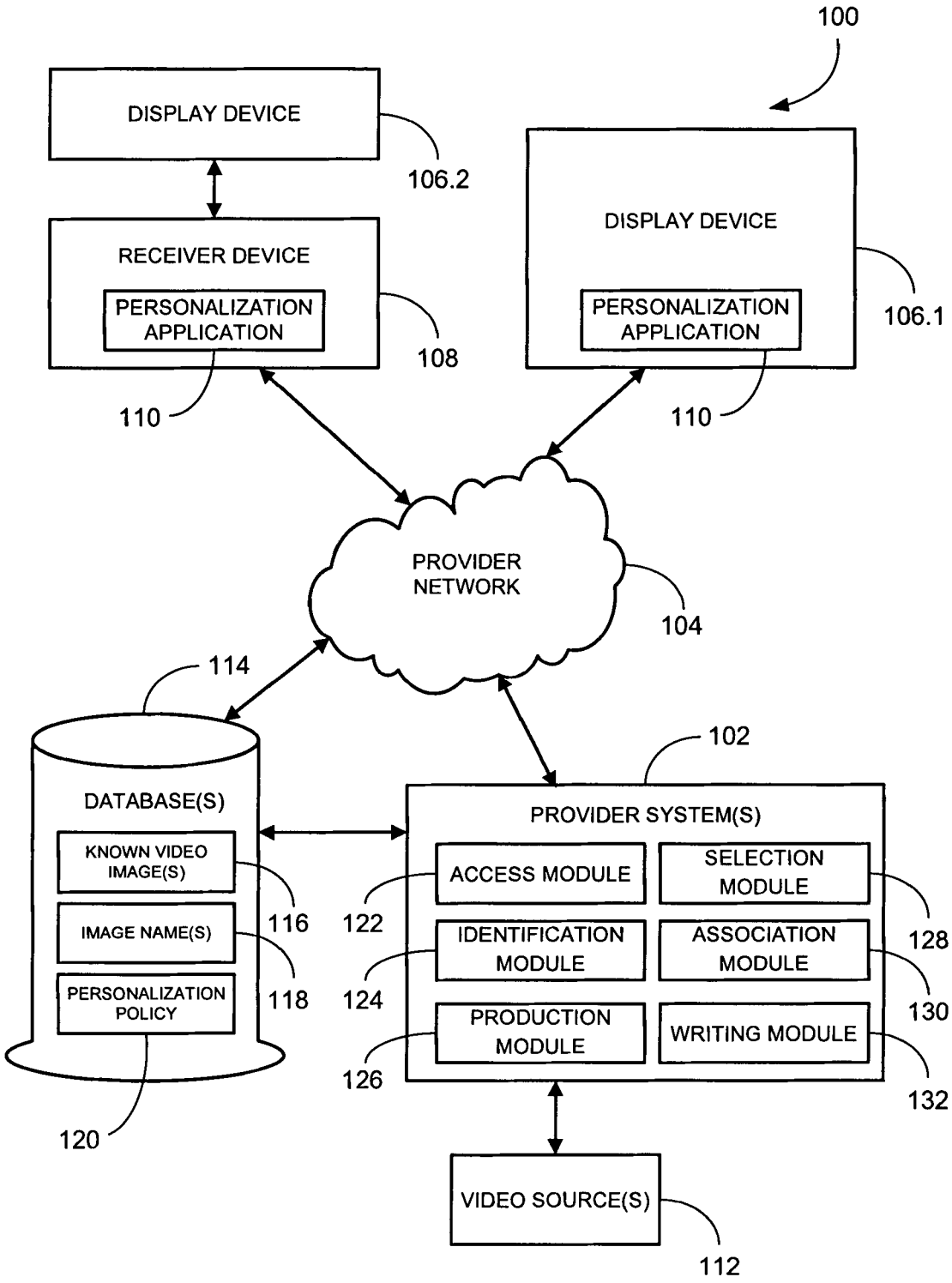
100
DISPLAY DEVICE
106.2
RECEIVER DEVICE
PERSONALIZATION APPLICATION
108
110
DISPLAY DEVICE
PERSONALIZATION APPLICATION
106.1
110
PROVIDER NETWORK
104
114
102
DATABASE(S)
KNOWN VIDEO IMAGE(S)
IMAGE NAME(S)
PERSONALIZATION POLICY
116
118
120
PROVIDER SYSTEM(S)
ACCESS MODULE
SELECTION MODULE
IDENTIFICATION MODULE
ASSOCIATION MODULE
PRODUCTION MODULE
WRITING MODULE
122
124
126
128
130
132
VIDEO SOURCE(S)
112

FIGURE 1

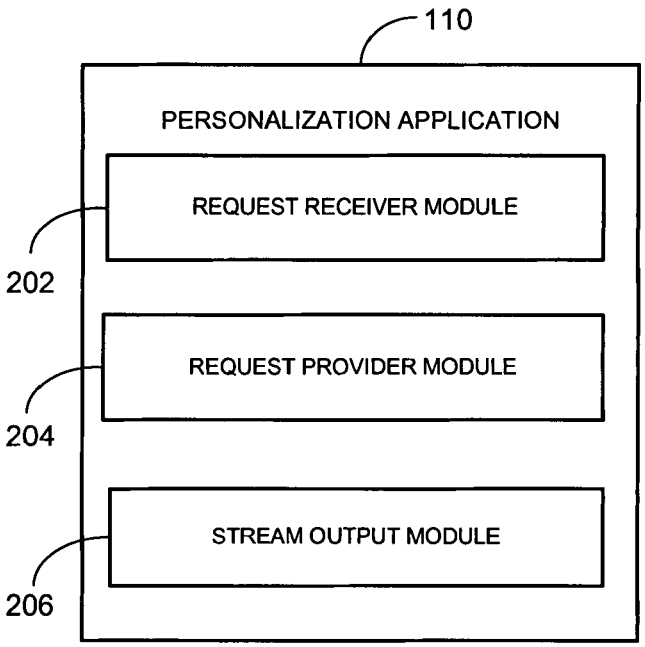
110
PERSONALIZATION APPLICATION
REQUEST RECEIVER MODULE
202
REQUEST PROVIDER MODULE
204
STREAM OUTPUT MODULE
206

FIGURE 2

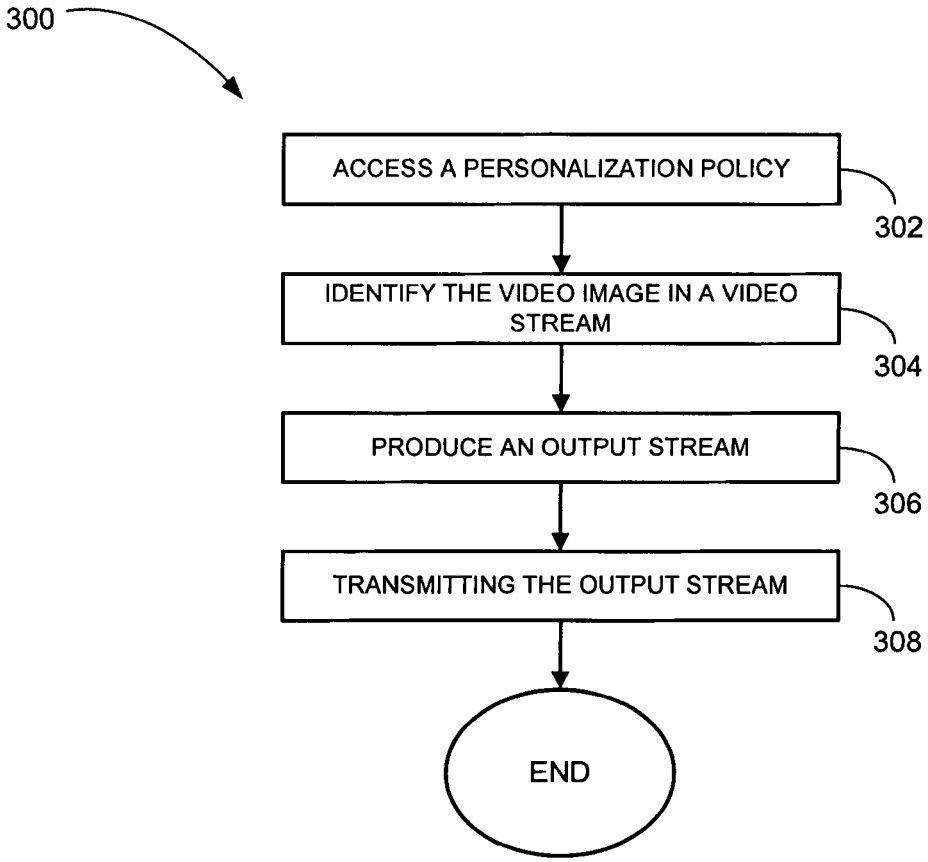
300
ACCESS A PERSONALIZATION POLICY
302
IDENTIFY THE VIDEO IMAGE IN A VIDEO STREAM
304
PRODUCE AN OUTPUT STREAM
306
TRANSMITTING THE OUTPUT STREAM
308
END

FIGURE 3

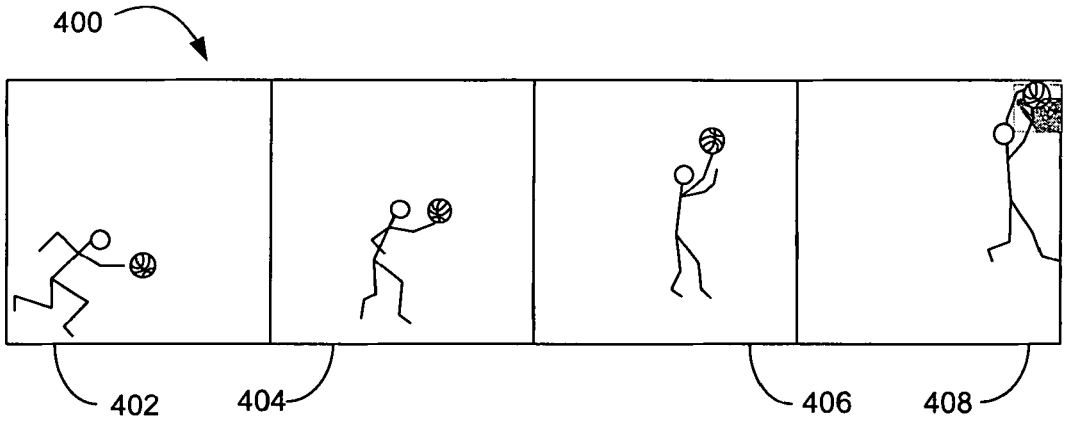

FIGURE 4

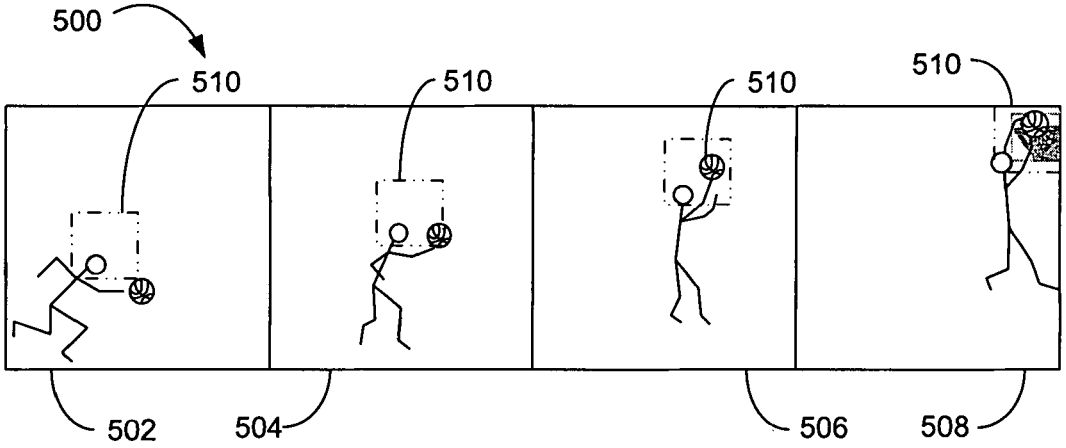

FIGURE 5

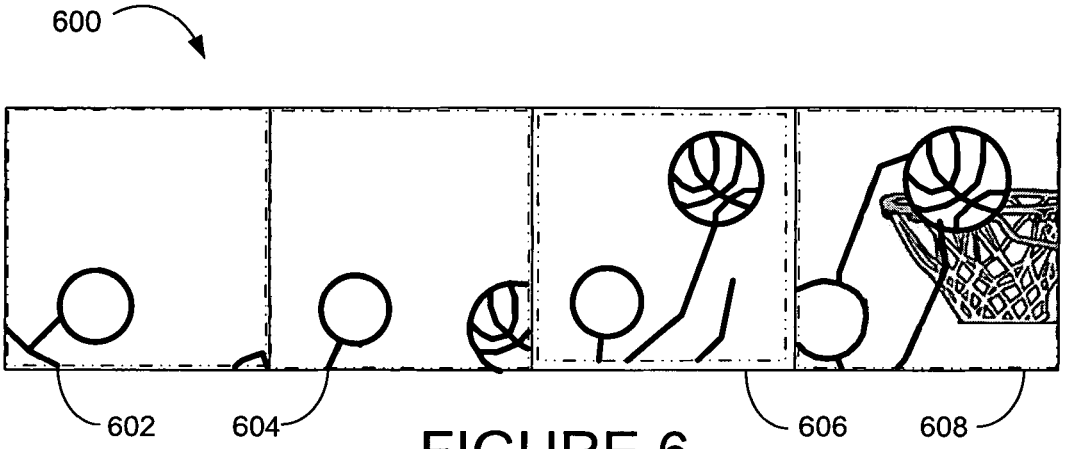

FIGURE 6

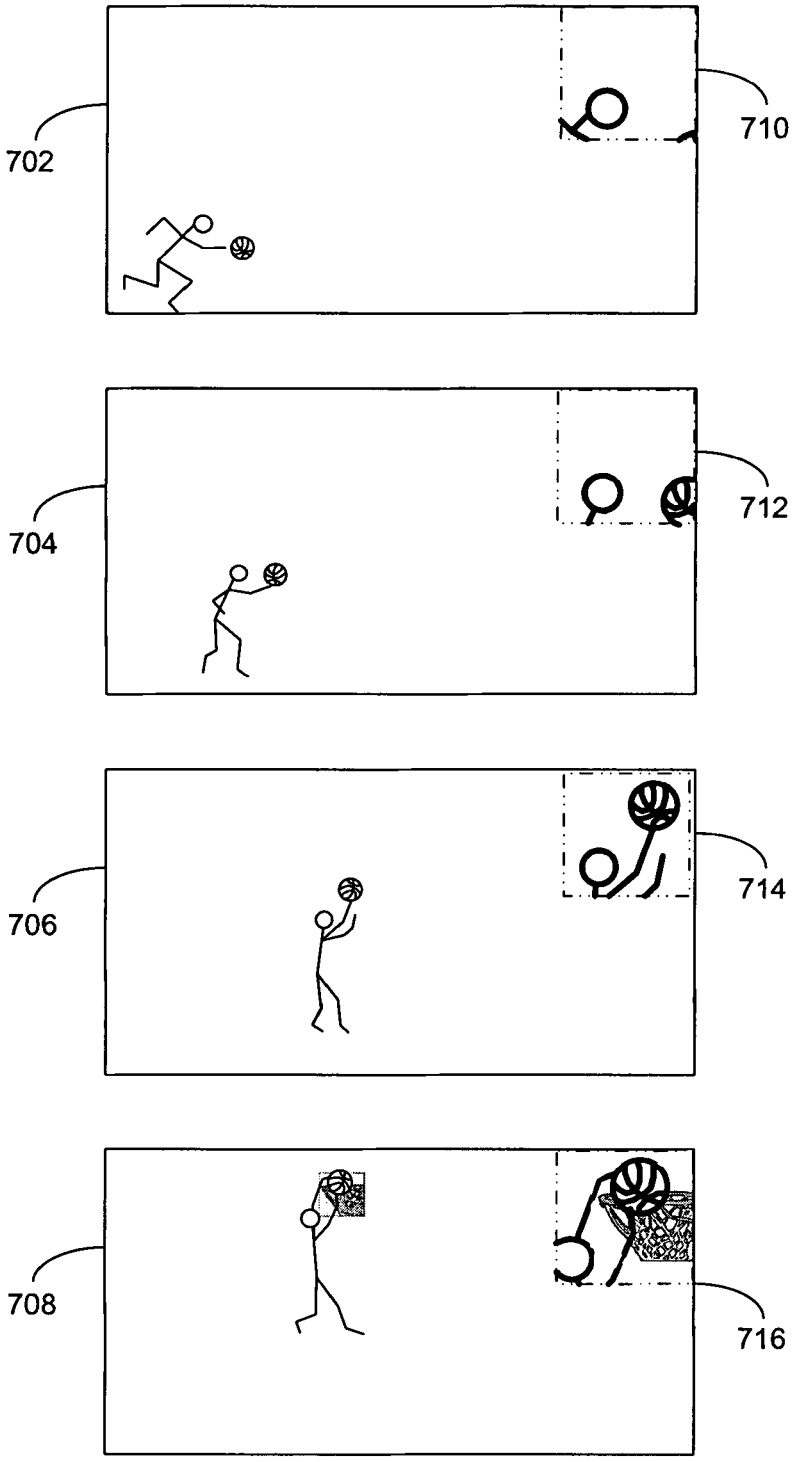

FIGURE 7

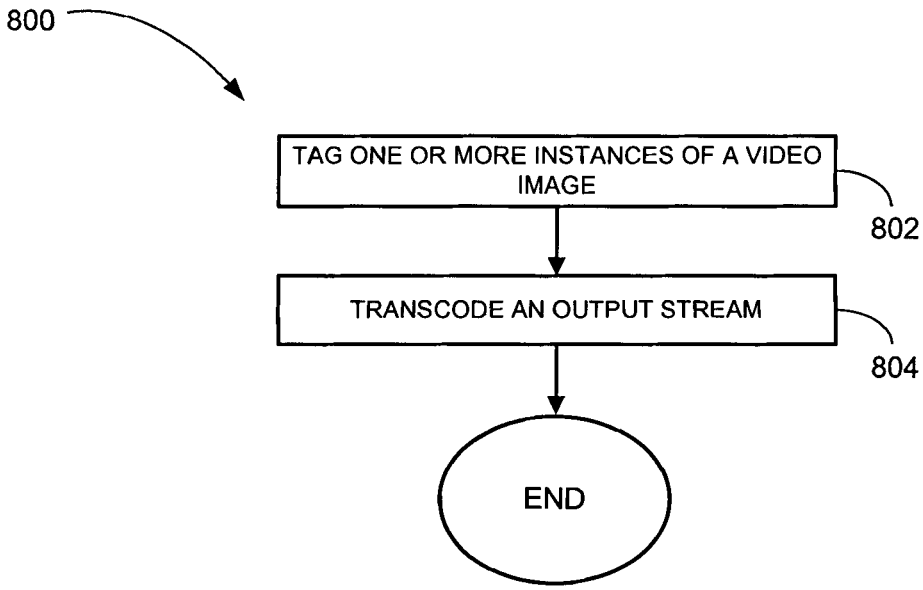
800
TAG ONE OR MORE INSTANCES OF A VIDEO IMAGE
802
TRANSCODE AN OUTPUT STREAM
804
END

FIGURE 8

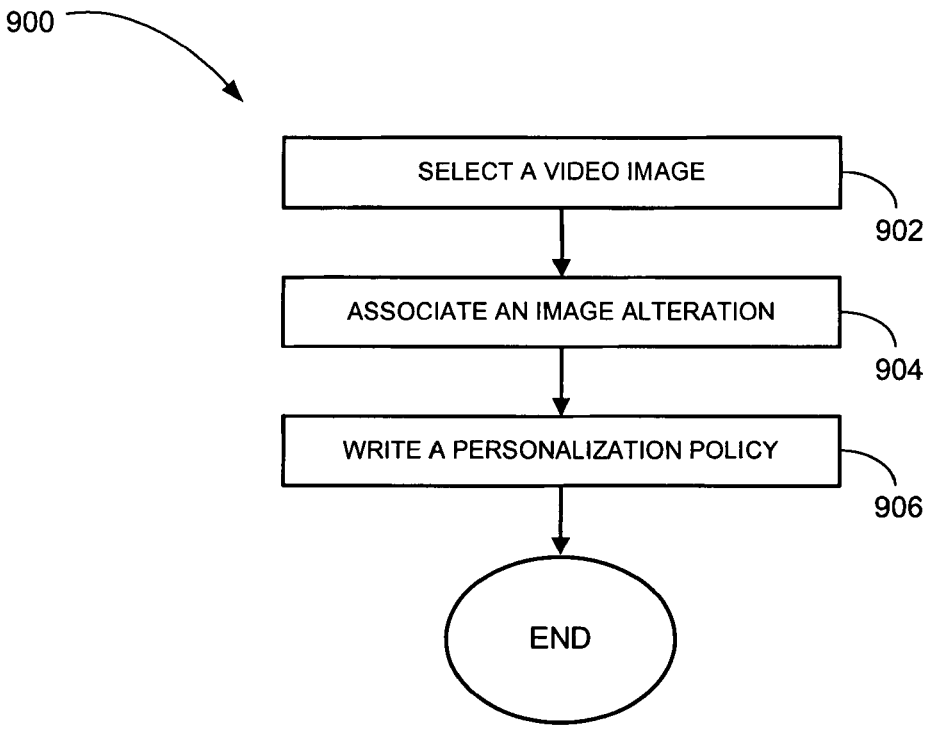
900
SELECT A VIDEO IMAGE
902
ASSOCIATE AN IMAGE ALTERATION
904
WRITE A PERSONALIZATION POLICY
906
END

FIGURE 9

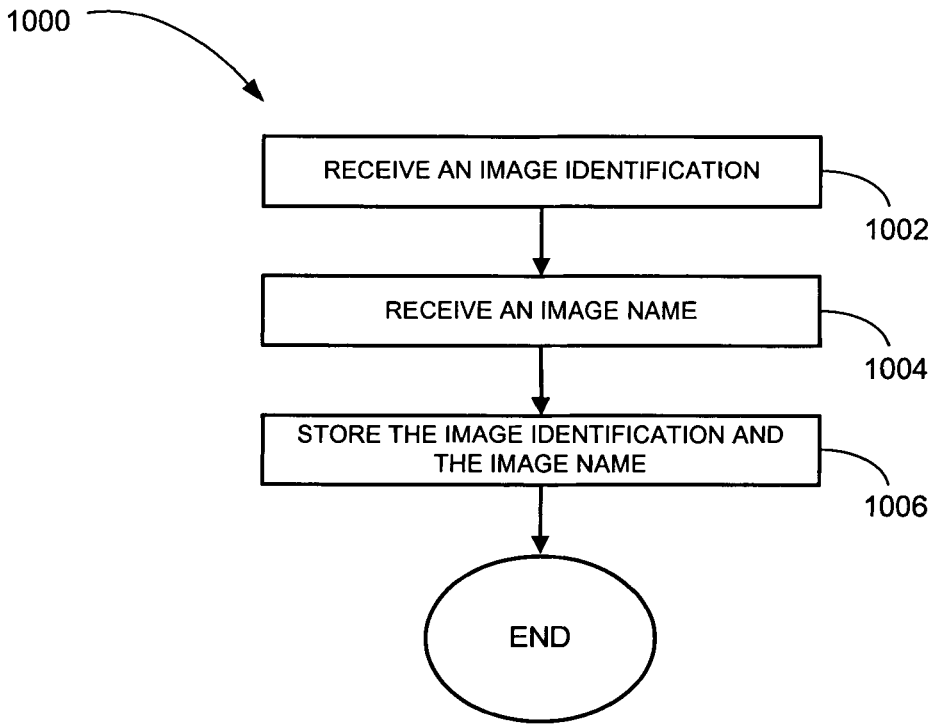
1000
RECEIVE AN IMAGE IDENTIFICATION
1002
RECEIVE AN IMAGE NAME
1004
STORE THE IMAGE IDENTIFICATION AND THE IMAGE NAME
1006
END

FIGURE 10

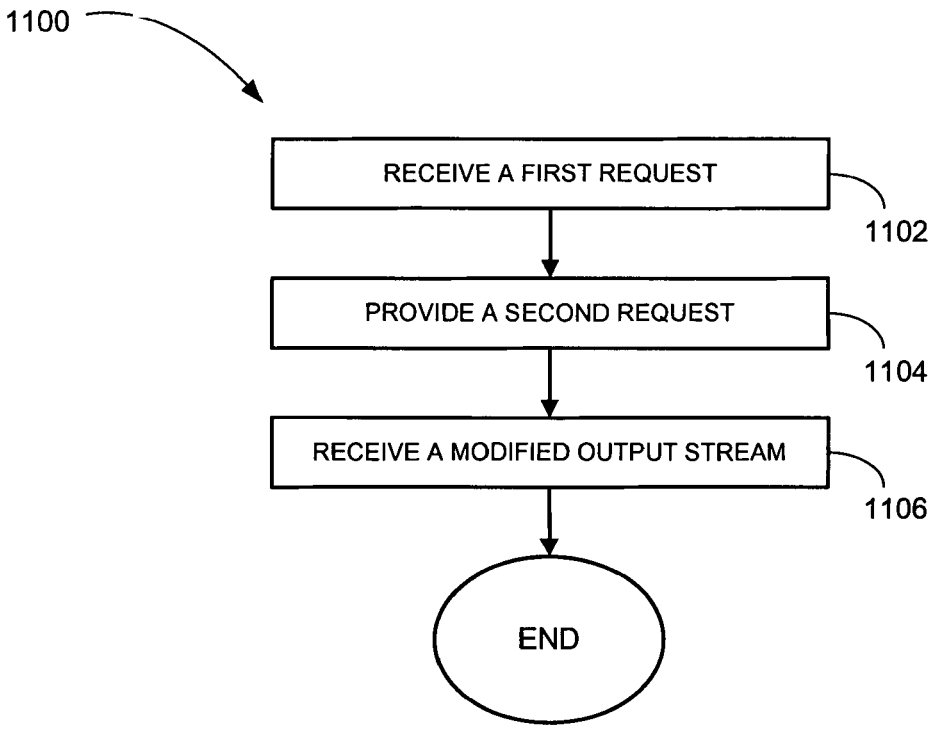
1100
RECEIVE A FIRST REQUEST
1102
PROVIDE A SECOND REQUEST
1104
RECEIVE A MODIFIED OUTPUT STREAM
1106
END

FIGURE 11

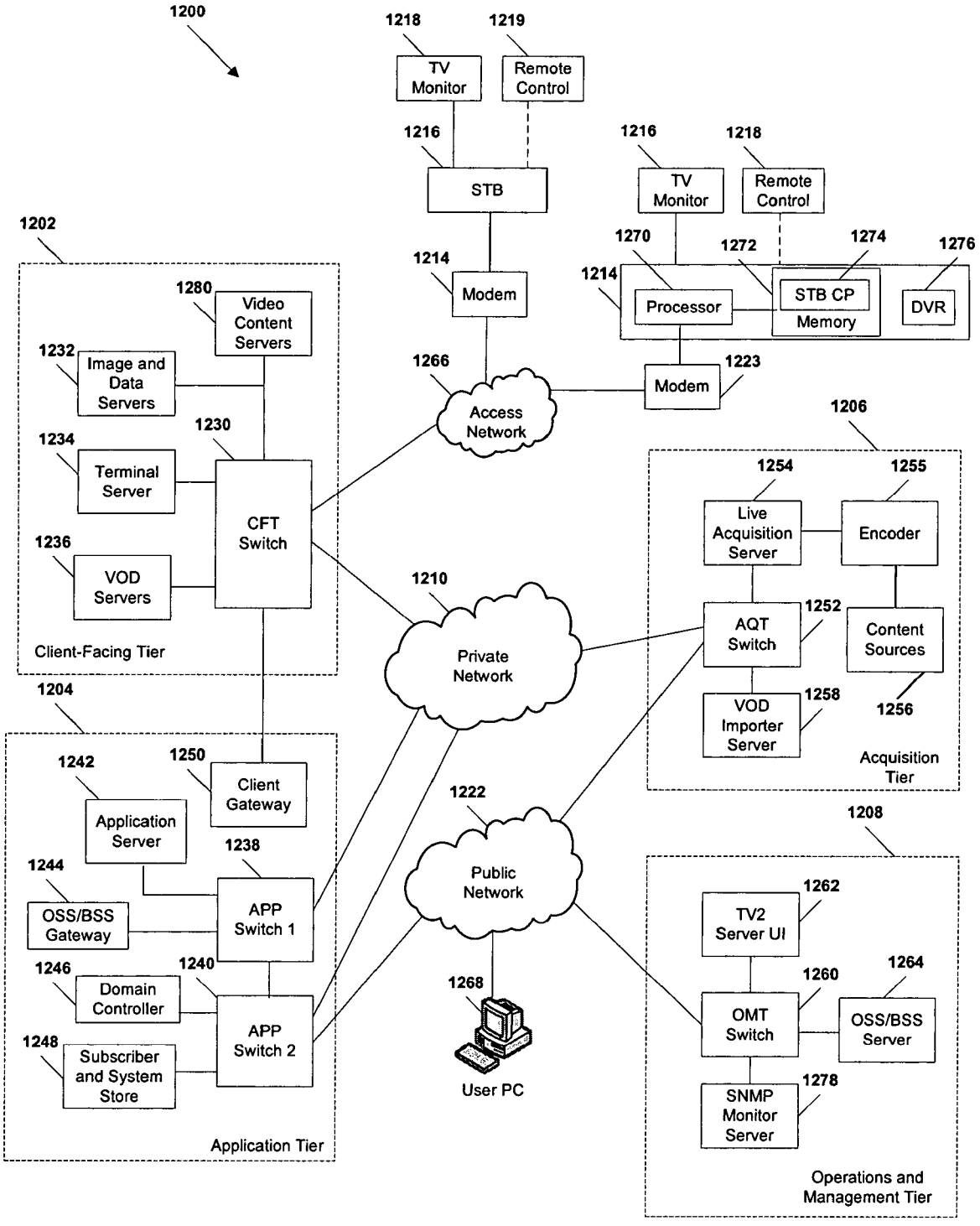
1200
1218
TV Monitor
1219
Remote Control
1216
STB
1214
Modem
1266
Access Network
1216
TV Monitor
1218
Remote Control
1270
1272
1274
1276
1214
Processor
STB CP
Memory
DVR
1223
Modem
1202
1280
Video Content Servers
1232
Image and Data Servers
1230
1234
Terminal Server
CFT Switch
1236
VOD Servers
Client-Facing Tier
1210
Private Network
1206
1254
1255
Live Acquisition Server
Encoder
AQT Switch
1252
Content Sources
1256
VOD Importer Server
1258
Acquisition Tier
1204
1242
1250
Application Server
Client Gateway
1238
1244
OSS/BSS Gateway
APP Switch 1
1246
1240
Domain Controller
APP Switch 2
1248
Subscriber and System Store
Application Tier
1222
Public Network
1208
1262
TV2 Server UI
1260
1264
OMT Switch
OSS/BSS Server
1278
SNMP Monitor Server
Operations and Management Tier
1268
User PC

FIGURE 12

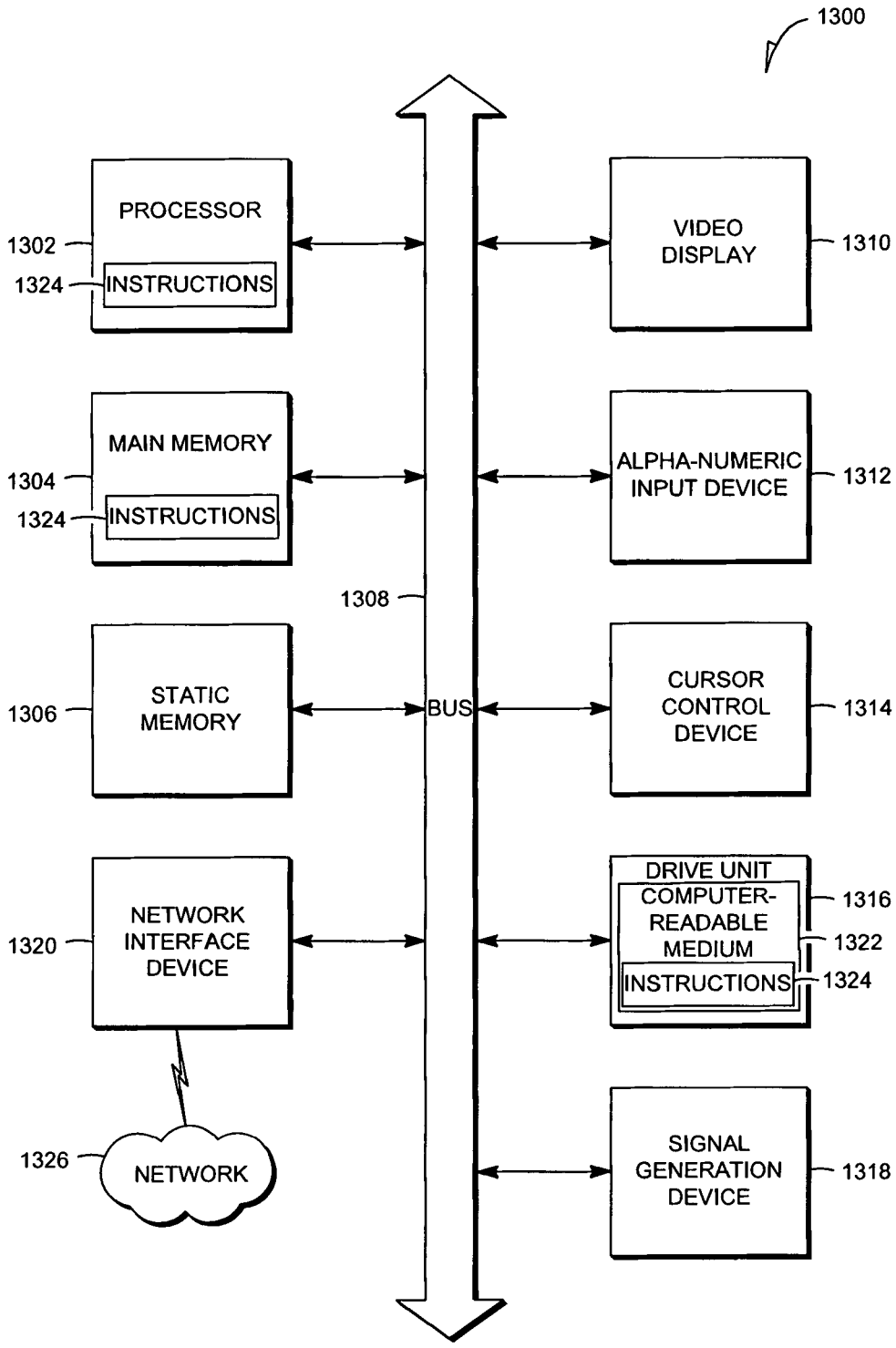
1300
PROCESSOR
1302
INSTRUCTIONS
1324
MAIN MEMORY
1304
INSTRUCTIONS
1324
1308
STATIC MEMORY
1306
BUS
NETWORK INTERFACE DEVICE
1320
1326
NETWORK
VIDEO DISPLAY
1310
ALPHA-NUMERIC INPUT DEVICE
1312
CURSOR CONTROL DEVICE
1314
DRIVE UNIT
COMPUTER-READABLE MEDIUM
1316
1322
INSTRUCTIONS
1324
SIGNAL GENERATION DEVICE
1318

FIGURE 13

METHOD AND SYSTEM FOR VIDEO STREAM PERSONALIZATION

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of and claims priority to U.S. application Ser. No. 14/823,176, filed Aug. 11, 2015, which is a continuation of and claims priority to U.S. application Ser. No. 11/786,663, filed Apr. 11, 2007 (now U.S. Pat. No. 9,137,497), which are incorporated herein by reference in their entirety.

FIELD OF THE DISCLOSURE

This application relates to a method and system for communication, and more specifically to systems and methods for providing video stream personalization.

BACKGROUND

A video client may receive a video stream from a number of available video streams based on a selection of a user of desired content. The selected video stream is then provided to the video client, which upon receipt may display the associated content or provide the content to another device for display.

A user is generally limited to viewing a selected video stream as provided. The user cannot customize the video stream based upon a personal interest, but may only obtain a different selection of an available video stream from a provider.

BRIEF DESCRIPTION OF THE DRAWINGS

Embodiments are illustrated by way of example and not limitation in the figures of the accompanying drawings, in which like references indicate similar elements and in which:

FIG. **1** is an example video system;

FIG. **2** is an example personalization application;

FIG. **3** is a flowchart illustrating a method for video stream personalization in accordance with an example embodiment;

FIGS. **4-7** are block diagrams of frames of a video stream according to an example embodiment;

FIG. **8** is a flowchart illustrating a method for producing an output stream in accordance with an example embodiment;

FIG. **9** is a flowchart illustrating a method for creating a personalization policy in accordance with an example embodiment;

FIG. **10** is a flowchart illustrating a method for selecting a video image in accordance with an example embodiment;

FIG. **11** is a flowchart illustrating a method for personalizing an output stream in accordance with an example embodiment;

FIG. **12** is a block diagram of an IPTV system in accordance with an example embodiment; and

FIG. **13** illustrates a diagrammatic representation of machine in the example form of a computer system within which a set of instructions for causing the machine to perform any one or more of the methodologies discussed herein may be executed.

DETAILED DESCRIPTION

Example methods and systems for video stream personalization are described. In the following description, for

purposes of explanation, numerous specific details are set forth in order to provide a thorough understanding of example embodiments. It will be evident, however, to one skilled in the art that the present invention may be practiced without these specific details.

In an example embodiment, a personalization policy may be accessed. The personalization policy may include an image identification and an image alteration to a video image identified by the image identification. At least one instance of the video image may be identified in a video stream. An output stream may be produced from the video stream in response to the personalization policy. The output stream may include the image alteration to the video image.

In an example embodiment, an image identification for a video image in a video stream may be selected. An image alteration may be associated with the video image. A personalization policy may be written for the video image. The personalization policy may have the image identification and an image alteration to the video image represented by the image identification.

In an example embodiment, a first request to alter an appearance of a video image within an output stream may be received. A second request including an image identification of the video image and an image alternation to the video image to a network resource may be provided. A modified output stream may be received according to a modified personalization policy.

FIG. **1** illustrates an example video stream system **100**. The video stream system **100** includes a provider system **104** that may receive one or more video streams from one or more video sources **112**. In accordance with video content of a selected video stream, the provider system **104** may provide an output stream over a provider network **104** to a display device **106.1** and/or to a display device **106.2** through a receiver device **108**.

The video stream may be a high quality video stream (e.g., MPEG-4) that is transcoded for distribution to the display device **106.1** and/or the receiver device **108**. The video stream may include video content (e.g., in the form of frames) and optionally audio content of a variety of types including television programs, movies, commercials, and the like.

The provider network **104** may be a Global System for Mobile Communications (GSM) network, an Internet Protocol (IP) network, a Wireless Application Protocol (WAP) network, and/or a Wifi network. Other networks may also be used.

A personalization application **110** may be embodied within the display device **106.1** and/or the receiver device **108** to enable personalization of an output stream as described in greater detail below. Examples of the receiver device **108** include a set-top box, a receiver card, a mobile phone, and a computing system; however other devices may also be used.

The provider system **102** may include an access module **122**, an identification module **124**, and a production module **126** to personalize an output stream and/or a selection module **128**, an association module **130**, and a writing module **132** to write a personalization policy **120** in a video image database **114**.

The access module **122** accesses the personalization policy **120**, while the identification module **124** identifies at least one instance of the video image in a video stream. The production module **126** thereafter produces an output stream from the video stream in response to the applicable personalization policy **120**.

The selection module **128** selects an image identification for a video image in a video stream, while the association module **130** associates an image alteration with the video image. The writing module **132** thereafter writes a personalization policy **120** for the video image, thereby enabling future presentations of the video streams that include applicable video images referenced in the personalization policy **120** to include the image alteration.

The provider system **102** may communicate with the video image database **114** directly and/or over a provider network **104**. The video image database **114** may include identification of known video images **116**, image names **118** for the known video images, and the personalization policy **120**.

The personalization policy **120** may be used to personalize an output stream from the provider system **102** to the display device **106.1** and/or the receiver device **108** as described in greater detail below. The personalization of the stream may enable dynamic changing of the video stream in response to the personalization policy **120** that may enhance a viewing experience by a particular user.

In an example embodiment, the personalization policy **120** may be a security policy that defines an authorization of a user to view the video stream. A plurality of personalization policies **120** may optionally be available in the video image database **114** for a plurality of associated users.

FIG. **2** illustrates an example personalization application **110** (see FIG. **1**) that may deployed in the video stream system **100**. However, the personalization application **110** may also be deployed in other systems.

The personalization application **110** may include a request receiver module **202**, a request provider module **204**, and/or a stream output module **206**. Other modules may also be used.

The request receiver module **202** receives a first request to alter appearance of a video image within an output stream. For example, a user may communicate with the request receiver module **202** through a user interface to request the image alteration.

The request provider module **204** provides a second request including an image identification of the video image and an image alternation to the video image to a network resource (e.g., the provider system **102**).

The stream output module **206** receives a modified output stream from the provider system **102** in response to a modified personalization policy **120** (see FIG. **1**).

FIG. **3** illustrates a method **300** for video stream personalization according to an example embodiment. The method **300** may be used by the provider system **102** (see FIG. **1**) to personalize a video stream for the display device **106.1** and/or the receiver device **108**, but may also be used to personalize a video stream in other systems.

A personalization policy may be accessed at block **302**. The personalization policy may include an image identification and an image alteration (e.g., a dynamic or defined image alteration) to a video image identified by the image identification. The video image may be a portion of a frame of the video stream for which image alteration is sought and the portion of the frame may be identified by the image identification. For example, the image identification may optionally identify a video image from the known video images **116**.

The image alteration to the video stream may include, by way of example, a zoom in view of a video image in the output stream, an enhanced resolution (e.g., more bits and/or less compression) of the video image, a replacement image (e.g., a bloody face with a non-bloody face) of the video image, a selection of an image in the output stream as a new video image, a deselection of the video image in the output stream, or the like. The image alteration may have the effect of removing a video image from the video stream or adding a video image to the video stream. Other image alterations may also be performed.

At least one instance of the video image may be identified in a video stream at block **304**. For example, the image identification may be accessed from the video image database **114** (e.g., from the personalization policy **120**) and at least one instance of the video image in the video stream matching with the image identification may be selected. The video image may, in an example embodiment, be identified during the operations at block **304** by matching an image name in metadata of the video stream with a name of the image identification.

An output stream including the image alteration to the video image may be produced from the video stream according to the personalization policy **120** at block **306**. The image alteration may partially or completely overlay the video image in the output stream, be in a selected location of one or more frames within the output stream (e.g., in a corner of a display device **106.1**, **106.2** when presented), or otherwise be present within the output stream. The image alteration may smoothly be integrated into the output stream or may be noticeable to a user (e.g., as a pop-up presentation).

In an example embodiment, a three-dimensional image of the video image may be produced and an output stream may be produced from the video stream for the user according to the personalization policy **120** during the operations at block **306**. The output stream may then include the three-dimensional image of the video image as the image alteration (e.g., as the video stream was in a two-dimensional format).

The output stream may be transmitted to a requestor (e.g., a device incorporating the personalization application **110**) at block **308**. For example, the output stream may be provided over the provider network **104** via a unicast and/or a multicast protocol, however other protocols may also be used.

By way of an example, a personalization policy **120** for a wedding video may define the faces of the bride and groom for image identification. The faces of the bride and groom may then be identified in the video stream and the output stream produced from the video stream may be altered in accordance with the personalization policy **120**. For example, zoomed in images of the faces may appear in an obtrusive portion in frames of the output stream, the faces may appear at a higher quality in the output stream, and the like.

FIGS. **4-7** are block diagrams of frames of a video stream according to an example embodiment. The frames **400** of FIG. **4** show a person engaging in a sports activity over a first frame **402**, a second frame **404**, a third frame **406**, and a fourth frame **408**. The frames **500** of FIG. **5** show an image identification **510** of a video image over a first frame **502**, a second frame **504**, a third frame **506**, and a fourth frame **508**.

The frames **600** of FIG. **6** and the frames **700** of the FIG. **7** show an example embodiment of a zoom in view of the frames **500** according to the image identification **510**. The video image over a first frame **602**, a second frame **604**, a third frame **606**, and a fourth frame **608** is shown to overlay an entire frame, while the video image over a first frame **702**, a second frame **704**, a third frame **706**, and a fourth frame **708** is shown to overlay a partial frame. Other zoom in views and/or other enhancements may also be made to the frames **500** based on the image identification **510**.

FIG. **8** illustrates a method **800** for producing an output stream according to an example embodiment. In an example embodiment, the method **800** may be performed at block **306** (see FIG. **3**).

At least one instance of the video image in the video stream may be tagged at block **802**.

An output stream may be transcoded from the tagged video stream for the user according to the personalization policy **120** (see FIG. **1**) and the one or more tagged instances at block **804**. The output stream may include metadata that includes the image alteration to the video image at the one or more tagged instances. For example, the video stream may be transcoded for display by the receiver device **108** and/or the display device **106.1**.

FIG. **9** illustrates a method **900** for creating a personalization policy **120** (see FIG. **1**) according to an example embodiment. In an example embodiment, the method **300** may be performed by the provider system **102** (see FIG. **1**).

An image identification for a video image in a video stream may be selected at block **902**.

An image alteration may be associated with the video image at block **904**. For example, a defined image alteration may be received from a user and the defined image alteration may be associated with the video image. An association of the defined image alteration with the image identification may optionally be stored in the video image database **114** (see FIG. **1**). In an example embodiment, an image alteration may optionally be dynamically associated with the video image from an association stored in the video image database **114** at block **904**.

A personalization policy **120** may be written for the video image at block **906**. The personalization policy **120** may include the image identification (e.g., from the known video images **116**) and an image alteration to a video image identified by the image identification.

FIG. **10** illustrates a method **1000** for selecting a video image according to an example embodiment. In an example embodiment, the method **1000** may be performed at block **902** (see FIG. **9**).

An image identification of a video image in a video stream may be received from a user at block **1002**. An image name of the image identification may optionally be received from a user at block **1004**. In an example embodiment, storing the image name of the video image identification may enable recognition of the video image in a video stream by both image comparison and a textual comparison to available metadata with the video stream that identifies video images.

The image identification of the video image and/or the image name may be stored in the video image database **114** at block **1006**.

FIG. **11** illustrates a method **1100** for personalizing an output stream according to an example embodiment. In an example embodiment, the method **1100** may be performed by the personalization application **110** (see FIG. **1**).

A first request to alter appearance of a video image with an output stream may be received at block **1102**. The first request may include an image identification of a video image and a selection of an image alteration to the video image. For example, the first request may be received from a user defining a video image that the user would like to alter in the output stream.

A second request including an image identification of the video image and an image alternation to the video image may be provided to a network resource (e.g., the provider system **102**) at block **1104**. A modified output stream in response to a modified personalization policy **120** may then be received at block **1106**.

FIG. **12** illustrates an example embodiment of an Internet Protocol Television (IPTV) system **1200** in which the video stream system **100** (see FIG. **1**) may be deployed and/or the methods **300**, **800-1100** (see FIGS. **3** and **8-11**). However, the video stream system **100** may be deployed in other types of IPTV and non-IPTV video streams, and the methods **300**, **800-1100** may be used in other systems.

The system **1200** as illustrated may include a client facing tier **1202**, an application tier **1204**, an acquisition tier **1206**, and an operations and management tier **1208**. Each tier **1202**, **1204**, **1206**, **1208** is coupled to a private network **1210**; to a public network **1222**, such as the Internet; or to both the private network **1210** and the public network **1222**. For example, the client-facing tier **1202** may be coupled to the private network **1210**. Further, the application tier **1204** may be coupled to the private network **1210** and to the public network **1222**. The acquisition tier **1206** may also be coupled to the private network **1210** and to the public network **1222**. Additionally, the operations and management tier **1208** may be coupled to the public network **1222**.

As illustrated in FIG. **12**, the various tiers **1202**, **1204**, **1206**, **1208** communicate with each other via the private network **1210** and the public network **1222**. For instance, the client-facing tier **1202** may communicate with the application tier **1204** and the acquisition tier **1206** via the private network **1210**. The application tier **1204** may also communicate with the acquisition tier **1206** via the private network **1210**. Further, the application tier **1204** may communicate with the acquisition tier **1206** and the operations and management tier **1208** via the public network **1222**. Moreover, the acquisition tier **1206** may communicate with the operations and management tier **1208** via the public network **1222**. In a particular embodiment, elements of the application tier **1204**, including, but not limited to, a client gateway **1250**, may communicate directly with the client-facing tier **1202**.

As illustrated in FIG. **12**, the client-facing tier **1202** may communicate with user equipment via a private access network **1266**, such as an Internet Protocol Television (IPTV) access network. In an illustrative embodiment, modems, such as a first modem **1214** and a second modem **1213** may be coupled to the private access network **1266**. The client-facing tier **1202** may communicate with a first representative set-top box device **1216** via the first modem **1214** and with a second representative set-top box device **1214** via the second modem **1212**. The client-facing tier **1202** may communicate with a large number of set-top boxes, such as the representative set-top boxes **1216**, **1214**, over a wide geographic area, such as a regional area, a metropolitan area, a viewing area, a designated market area or any other suitable geographic area, market area, or subscriber or customer group that may be supported by networking the client-facing tier **1202** to numerous set-top box devices. In an illustrative embodiment, the client-facing tier, or any portion thereof, may be included at a video head-end office.

In a particular embodiment, the client-facing tier **1202** may be coupled to the modems **1214**, **1213** via fiber optic cables. Alternatively, the modems **1214** and **1213** may be digital subscriber line (DSL) modems that are coupled to one or more network nodes via twisted pairs, and the client-facing tier **1202** may be coupled to the network nodes via fiber-optic cables. Each set-top box device **1216**, **1214** may process data received via the private access network **1266**, via an IPTV software platform, such as Microsoft® TV IPTV Edition. In another embodiment, representative

set-top boxes **1216**, **1214** may receive data from private access network **1266** through RF and other cable and/or satellite based networks.

Additionally, the first set-top box device **1216** may be coupled to a first external display device, such as a first television monitor **1218**, and the second set-top box device **1214** may be coupled to a second external display device, such as a second television monitor **1216**. Moreover, the first set-top box device **1216** may communicate with a first remote control **1219**, and the second set-top box device may communicate with a second remote control **1218**.

In an example, non-limiting embodiment, each set-top box device **1216**, **1214** may receive video content, which may include video and audio portions, from the client-facing tier **1202** via the private access network **1266**. The set-top boxes **1216**, **1214** may transmit the video content to an external display device, such as the television monitors **1218**, **1216**. Further, the set-top box devices **1216**, **1214** may each include a STB processor, such as STB processor **1270**, and a STB memory device, such as STB memory **1272**, which is accessible to the STB processor **1270**. In one embodiment, a computer program, such as the STB computer program **1274**, may be embedded within the STB memory device **1272**. Each set-top box device **1216**, **1214** may also include a video content storage module, such as a digital video recorder (DVR) **1276**. In a particular embodiment, the set-top box devices **1216**, **1214** may communicate commands received from the remote control devices **1219**, **1218** to the client-facing tier **1202** via the private access network **1266**.

In an illustrative embodiment, the client-facing tier **1202** may include a client-facing tier (CFT) switch **1230** that manages communication between the client-facing tier **1202** and the private access network **1266** and between the client-facing tier **1202** and the private network **1210**. As shown, the CFT switch **1230** is coupled to one or more image and data servers **1232** that store still images associated with programs of various IPTV channels. The image and data servers **1232** may also store data related to various channels, e.g., types of data related to the channels and to programs or video content displayed via the channels. In an illustrative embodiment, the image and data servers **1232** may be a cluster of servers, each of which may store still images, channel and program-related data, or any combination thereof. The CFT switch **1230** may also be coupled to a terminal server **1234** that provides terminal devices with a connection point to the private network **1210**. In a particular embodiment, the CFT switch **1230** may also be coupled to one or more video-on-demand (VOD) servers **1236** that store or provide VOD content imported by the IPTV system **1200**. In an illustrative, non-limiting embodiment, the VOD content servers **1280** may include one or more unicast servers.

The client-facing tier **1202** may also include one or more video content servers **1280** that transmit video content requested by viewers via their set-top boxes **1216**, **1214**. In an illustrative, non-limiting embodiment, the video content servers **1280** may include one or more multicast servers.

As illustrated in FIG. **12**, the application tier **1204** may communicate with both the private network **1210** and the public network **1222**. The application tier **1204** may include a first application tier (APP) switch **1238** and a second APP switch **1240**. In a particular embodiment, the first APP switch **1238** may be coupled to the second APP switch **1240**. The first APP switch **1238** may be coupled to an application server **1242** and to an OSS/BSS gateway **1244**. In a particular embodiment, the application server **1242** may provide applications to the set-top box devices **1216**, **1214** via the private access network **1266**, which enable the set-top box devices **1216**, **1214** to provide functions, such as display, messaging, processing of IPTV data and VOD material, etc. In a particular embodiment, the OSS/BSS gateway **1244** includes operation systems and support (OSS) data, as well as billing systems and support (BSS) data. In one embodiment, the OSS/BSS gateway may provide or restrict access to an OSS/BSS server **1264** that stores operations and billing systems data.

Further, the second APP switch **1240** may be coupled to a domain controller **1246** that provides web access, for example, to users via the public network **1222**. For example, the domain controller **1246** may provide remote web access to IPTV account information via the public network **1222**, which users may access using their personal computers **1268**. The second APP switch **1240** may be coupled to a subscriber and system store **1248** that includes account information, such as account information that is associated with users who access the system **1200** via the private network **1210** or the public network **1222**. In a particular embodiment, the application tier **1204** may also include a client gateway **1250** that communicates data directly with the client-facing tier **1202**. In this embodiment, the client gateway **1250** may be coupled directly to the CFT switch **1230**. The client gateway **1250** may provide user access to the private network **1210** and the tiers coupled thereto.

In a particular embodiment, the set-top box devices **1216**, **1214** may access the IPTV system **1200** via the private access network **1266**, using information received from the client gateway **1250**. In this embodiment, the private access network **1266** may provide security for the private network **1210**. User devices may access the client gateway **1250** via the private access network **1266**, and the client gateway **1250** may allow such devices to access the private network **1210** once the devices are authenticated or verified. Similarly, the client gateway **1250** may prevent unauthorized devices, such as hacker computers or stolen set-top box devices from accessing the private network **1210**, by denying access to these devices beyond the private access network **1266**.

For example, when the first representative set-top box device **1216** accesses the system **1200** via the private access network **1266**, the client gateway **1250** may verify subscriber information by communicating with the subscriber and system store **1248** via the private network **1210**, the first APP switch **1238**, and the second APP switch **1240**. Further, the client gateway **1250** may verify billing information and status by communicating with the OSS/BSS gateway **1244** via the private network **1210** and the first APP switch **1238**. In one embodiment, the OSS/BSS gateway **1244** may transmit a query across the first APP switch **1238**, to the second APP switch **1240**, and the second APP switch **1240** may communicate the query across the public network **1222** to the OSS/BSS server **1264**. After the client gateway **1250** confirms subscriber and/or billing information, the client gateway **1250** may allow the set-top box device **1216** access to IPTV content and VOD content. If the client gateway **1250** is unable to verify subscriber information for the set-top box device **1216**, e.g., because it is connected to an unauthorized twisted pair, the client gateway **1250** may block transmissions to and from the set-top box device **1216** beyond the private access network **1266**.

As indicated in FIG. **12**, the acquisition tier **1206** includes an acquisition tier (AQT) switch **1252** that communicates with the private network **1210**. The AQT switch **1252** may also communicate with the operations and management tier

1208 via the public network 1222. In a particular embodiment, the AQT switch 1252 may be coupled to a live acquisition server 1254 that receives television or movie content, for example, from content sources 1256 through an encoder 1255. In a particular embodiment during operation of the IPTV system, the live acquisition server 1254 may acquire television or movie content. The live acquisition server 1254 may transmit the television or movie content to the AQT switch 1252 and the AQT switch 1252 may transmit the television or movie content to the CFT switch 1230 via the private network 1210.

Further, the television or movie content may be transmitted to the video content servers 1280, where it may be encoded, formatted, stored, or otherwise manipulated and prepared for communication to the set-top box devices 1216, 1214. The CFT switch 1230 may communicate the television or movie content to the modems 1214, 1213 via the private access network 1266. The set-top box devices 1216, 1214 may receive the television or movie content via the modems 1214, 1213, and may transmit the television or movie content to the television monitors 1218, 1216. In an illustrative embodiment, video or audio portions of the television or movie content may be streamed to the set-top box devices 1216, 1214.

Further, the AQT switch may be coupled to a video-on-demand importer server 1258 that stores television or movie content received at the acquisition tier 1206 and communicates the stored content to the VOD server 1236 at the client-facing tier 1202 via the private network 1210. Additionally, at the acquisition tier 1206, the video-on-demand (VOD) importer server 1258 may receive content from one or more VOD sources outside the IPTV system 1200, such as movie studios and programmers of non-live content. The VOD importer server 1258 may transmit the VOD content to the AQT switch 1252, and the AQT switch 1252, in turn, may communicate the material to the CFT switch 1230 via the private network 1210. The VOD content may be stored at one or more servers, such as the VOD server 1236.

When user issue requests for VOD content via the set-top box devices 1216, 1214, the requests may be transmitted over the private access network 1266 to the VOD server 1236, via the CFT switch 1230. Upon receiving such requests, the VOD server 1236 may retrieve the requested VOD content and transmit the content to the set-top box devices 1216, 1214 across the private access network 1266, via the CFT switch 1230. The set-top box devices 1216, 1214 may transmit the VOD content to the television monitors 1218, 1216. In an illustrative embodiment, video or audio portions of VOD content may be streamed to the set-top box devices 1216, 1214.

FIG. 12 further illustrates that the operations and management tier 1208 may include an operations and management tier (OMT) switch 1260 that conducts communication between the operations and management tier 1208 and the public network 1222. In the embodiment illustrated by FIG. 1, the OMT switch 1260 is coupled to a TV2 server 1262. Additionally, the OMT switch 1260 may be coupled to an OSS/BSS server 1264 and to a simple network management protocol (SNMP) monitor 1270 that monitors network devices within or coupled to the IPTV system 1200. In a particular embodiment, the OMT switch 1260 may communicate with the AQT switch 1252 via the public network 1222.

In an illustrative embodiment, the live acquisition server 1254 may transmit the television or movie content to the AQT switch 1252, and the AQT switch 1252, in turn, may transmit the television or movie content to the OMT switch 1260 via the public network 1222. In this embodiment, the OMT switch 1260 may transmit the television or movie content to the TV2 server 1262 for display to users accessing the user interface at the TV2 server 1262. For example, a user may access the TV2 server 1262 using a personal computer (PC) 1268 coupled to the public network 1222.

FIG. 13 shows a diagrammatic representation of machine in the example form of a computer system 1300 within which a set of instructions for causing the machine to perform any one or more of the methodologies discussed herein may be executed. In alternative embodiments, the machine operates as a standalone device or may be connected (e.g., networked) to other machines. In a networked deployment, the machine may operate in the capacity of a server or a client machine in server-client network environment, or as a peer machine in a peer-to-peer (or distributed) network environment. The machine may be a personal computer (PC), a tablet PC, a set-top box (STB), a Personal Digital Assistant (PDA), a cellular telephone, a web appliance, a network router, switch or bridge, or any machine capable of executing a set of instructions (sequential or otherwise) that specify actions to be taken by that machine. Further, while only a single machine is illustrated, the term "machine" shall also be taken to include any collection of machines that individually or jointly execute a set (or multiple sets) of instructions to perform any one or more of the methodologies discussed herein.

The example computer system 1300 includes a processor 1302 (e.g., a central processing unit (CPU), a graphics processing unit (GPU) or both), a main memory 1304 and a static memory 1306, which communicate with each other via a bus 1308. The computer system 1300 may further include a video display unit 1310 (e.g., a liquid crystal display (LCD) or a cathode ray tube (CRT)). The computer system 1300 also includes an alphanumeric input device 1312 (e.g., a keyboard), a user interface (UI) navigation device 1314 (e.g., a mouse), a disk drive unit 1316, a signal generation device 1318 (e.g., a speaker) and a network interface device 1320.

The disk drive unit 1316 includes a machine-readable medium 1322 on which is stored one or more sets of instructions and data structures (e.g., software 1324) embodying or utilized by any one or more of the methodologies or functions described herein. The software 1324 may also reside, completely or at least partially, within the main memory 1304 and/or within the processor 1302 during execution thereof by the computer system 1300, the main memory 1304 and the processor 1302 also constituting machine-readable media.

The software 1324 may further be transmitted or received over a network 1250 via the network interface device 1320 utilizing any one of a number of well-known transfer protocols (e.g., HTTP).

While the machine-readable medium 1322 is shown in an example embodiment to be a single medium, the term "machine-readable medium" should be taken to include a single medium or multiple media (e.g., a centralized or distributed database, and/or associated caches and servers) that store the one or more sets of instructions. The term "machine-readable medium" shall also be taken to include any medium that is capable of storing, encoding or carrying a set of instructions for execution by the machine and that cause the machine to perform any one or more of the methodologies of the present invention, or that is capable of storing, encoding or carrying data structures utilized by or associated with such a set of instructions. The term

"machine-readable medium" shall accordingly be taken to include, but not be limited to, solid-state memories and optical and magnetic media.

Although an embodiment of the present invention has been described with reference to specific example embodiments, various modifications and changes may be made to these embodiments without departing from the broader spirit and scope of the invention. Accordingly, the specification and drawings are to be regarded in an illustrative rather than a restrictive sense. The accompanying drawings that form a part hereof, show by way of illustration, and not of limitation, specific embodiments in which the subject matter may be practiced. The embodiments illustrated are described in sufficient detail to enable those skilled in the art to practice the teachings disclosed herein. Other embodiments may be utilized and derived therefrom, such that structural and logical substitutions and changes may be made without departing from the scope of this disclosure. This Detailed Description, therefore, is not to be taken in a limiting sense, and the scope of various embodiments is defined only by the appended claims, along with the full range of equivalents to which such claims are entitled.

Such embodiments of the inventive subject matter may be referred to herein, individually and/or collectively, by the term "invention" merely for convenience and without intending to voluntarily limit the scope of this application to any single invention or inventive concept if more than one is in fact disclosed. Thus, although specific embodiments have been illustrated and described herein, it should be appreciated that any arrangement calculated to achieve the same purpose may be substituted for the specific embodiments shown. This disclosure is intended to cover any and all adaptations or variations of various embodiments. Combinations of the above embodiments, and other embodiments not specifically described herein, will be apparent to those of skill in the art upon reviewing the above description.

The Abstract of the Disclosure is provided with the understanding that it will not be used to interpret or limit the scope or meaning of the claims. In addition, in the foregoing Detailed Description, it can be seen that various features are grouped together in a single embodiment for the purpose of streamlining the disclosure. This method of disclosure is not to be interpreted as reflecting an intention that the claimed embodiments require more features than are expressly recited in each claim. Rather, as the following claims reflect, inventive subject matter lies in less than all features of a single disclosed embodiment. Thus the following claims are hereby incorporated into the Detailed Description, with each claim standing on its own as a separately claimed subject matter.

What is claimed is:

1. A device comprising:

a processing system including a processor; and

a memory that stores executable instructions that, when executed by the processing system, facilitate performance of operations, the operations comprising:

receiving a video stream comprising a plurality of frames;

identifying a video image in the video stream responsive to receiving a selection of the video image during a presentation of the video stream, wherein the identifying is based on matching an image name in a metadata of the video stream with a name of an image identification accessed from a database, and wherein the image identification identifies a portion of a frame included in the plurality of frames of the video stream;

associating the image identification and an image alteration with the video image to generate a personalization policy, the associating being responsive to detecting user input indicating the image alteration;

generating a plurality of altered images of additional images based on the personalization policy, wherein the plurality of altered images comprises a zoomed-in image of a part of the video image; and

producing an adjusted video stream, the adjusted video stream including the plurality of altered images overlaying a portion of the video image, wherein a first position of content included in the video image of the video stream is shifted so as to be located at a second position in the video image of the adjusted video stream, and wherein the second position is different from the first position.

2. The device of claim **1**, wherein the plurality of altered images is generated during the receiving of the video stream.

3. The device of claim **1**, wherein the plurality of altered images overlays the video image at a selected location.

4. The device of claim **1**, wherein the operations further comprise enhancing a resolution of the plurality of altered images.

5. The device of claim **1**, wherein the database includes a video image database, and wherein the identifying of the video image comprises:

accessing the image identification from the video image database; and

matching the video image with the image identification.

6. The device of claim **1**, wherein the identifying of the video image comprises matching an image name in metadata of the video stream with a name of the video image.

7. The device of claim **1**, wherein the producing of the adjusted video stream further comprises transcoding the adjusted video stream.

8. The device of claim **1**, wherein the producing of the adjusted video stream further comprises tagging the video image in the video stream as a tagged instance.

9. The device of claim **8**, wherein the producing of the adjusted video stream further comprises transcoding the adjusted video stream, and wherein the adjusted video stream comprises second metadata including the image alteration to the video image at the tagged instance in the adjusted video stream.

10. The device of claim **1**, wherein the video image comprises a face.

11. The device of claim **10**, wherein the image alteration comprises a zoomed-in image of the face that provides an enhanced resolution of the face.

12. The device of claim **11**, wherein the plurality of frames comprises a first plurality of frames, and wherein a respective altered image included in the plurality of altered images overlays an entirety of each frame of the first plurality of frames.

13. A non-transitory machine-readable storage medium comprising executable instructions that, when executed by a processing system including a processor, facilitate performance of operations, the operations comprising:

receiving a video stream;

identifying a video image in the video stream responsive to receiving a selection of the video image during a presentation of the video stream, wherein the identifying is based on matching an image name in metadata of the video stream with a name of an image identification accessed from a database, and wherein the image identification identifies a portion of a frame included in a plurality of frames of the video stream;

associating the image identification and an image alteration with the video image to generate a personalization policy, the associating being responsive to detecting user input indicating the image alteration;

generating a plurality of altered images of additional images based on the personalization policy, wherein the plurality of altered images comprises a zoomed-in image of a part of the video image; and

producing an adjusted video stream, the adjusted video stream including the plurality of altered images overlaying a selected location of the video image in the video stream, wherein a first position of content included in the video image of the video stream is shifted so as to be located at a second position in the video image of the adjusted video stream, and wherein the second position is different from the first position.

14. The non-transitory machine-readable storage medium of claim **13**, wherein the database includes a video image database, and wherein the identifying of the video image comprises:

accessing the image identification of the video image from the video image database; and

matching the video image with the image identification.

15. The non-transitory machine-readable storage medium of claim **13**, wherein the identifying of the video image comprises matching an image name in metadata of the video stream with a name of the video image.

16. The non-transitory machine-readable storage medium of claim **13**, wherein the producing of the adjusted video stream further comprises transcoding the adjusted video stream.

17. The non-transitory machine-readable storage medium of claim **13**, wherein the video image comprises a face, and wherein the image alteration comprises a zoomed-in image of the face that provides an enhanced resolution of the face.

18. A method comprising:

receiving, by a processing system including a processor, a video stream comprising a plurality of frames;

identifying, by the processing system, a plurality of faces in the video stream responsive to receiving a selection of the plurality of faces during a presentation of the video stream;

identifying a video image in the video stream responsive to receiving the selection of the plurality of faces during the presentation of the video stream, wherein the identifying of the video image is based on matching an image name in metadata of the video stream with a name of an image identification accessed from a database, and wherein the image identification identifies a portion of a frame included in the plurality of frames of the video stream

associating the image identification and a plurality of alterations with the plurality of faces to generate a personalization policy, the associating being responsive to detecting user input indicating the plurality of alterations;

generating, by the processing system, a plurality of altered images, the plurality of altered images including a plurality of zoomed-in images of the plurality of faces based on the personalization policy; and

producing, by the processing system, an adjusted video stream, the adjusted video stream including the plurality of altered images overlaying a portion of the plurality of frames, wherein a first position of content included in a first frame of the plurality of frames of the video stream is shifted so as to be located at a second position in the first frame of the plurality of frames of the adjusted video stream, and wherein the second position is different from the first position.

19. The method of claim **18**, wherein the producing of the adjusted video stream further comprises transcoding the adjusted video stream.

20. The method of claim **18**, wherein the producing of the adjusted video stream further comprises tagging a face included in the plurality of faces in the video stream as a tagged instance.

21. The method of claim **20**, wherein the producing of the adjusted video stream further comprises transcoding the adjusted video stream in response to the tagged instance.

22. The method of claim **18**, wherein the plurality of zoomed-in images of the plurality of faces provides an enhanced resolution of the plurality of faces.

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